



AC Transit of Oakland and SunLine Transit of Thousand Palms Fuel Cell Development – Zero-emission Bus Program

FACTS AND FIGURES

BACKGROUND

AC Transit, with over \$14 million in grants, and SunLine Transit with grants totaling \$4 million, have initiated an internationally recognized fuel cell demonstration program.

As members of the California Fuel Cell Partnership, the primary objective is to work in partnership with the private sector to commercialize fuel cell technology for the transit industry.

Our environmentally friendly zero-emission fuel cell buses are quiet, electrically propelled vehicles. Their exhaust is distilled water emitted from the tailpipe in the form of steam, which evaporates and has no adverse impacts on air quality.

Acting as the lead agency in the procurement process, AC Transit is entering into an exclusive agreement with ISE Research — ThunderVolt (ISE) of San Diego, (a designer and integrator of fuel cell, hybrid electric propulsion systems), and UTC Fuel Cells of Connecticut, (a United Technologies company), for the delivery of four fuel cell buses, beginning September 2005. Three buses will be owned and operated by AC Transit, who will work cooperatively with the Golden Gate Bridge, Highway and Transportation District in San Rafael, to demonstrate and evaluate fuel cells vehicles in comparison with diesel buses. SunLine Transit will own and operate a fourth bus.

BUS MANUFACTURERS

AC Transit has contracted with Van Hool of Belgium to build three 40' bus bodies (or gliders), Model #A330, and one for SunLine Transit.

PROPULSION SYSTEM

Fuel cell, hybrid-electric propulsion system, utilizing fuel cells from UTC, and Zebra nickel sodium chloride batteries, to provide acceleration and hill-climbing power and to store energy from regenerative braking.

WARRANTY

Two-year warranty on the fuel cell power train.

COST

Approximately \$3.13 million per bus.



REVENUE SOURCES

AC Transit Funding

Primarily funded by the State of California as follows:

- \$8 million from State of California
- \$2.5 million from the California Air Resources Board
- \$1.1 million of matching funds from AC Transit
- \$1 million from the California Energy Commission
- \$1 million from the Bay Area Air Quality Management District
- \$1 million Federal Trust Fund
- \$300,000 from a Department of Energy, Clean Cities Grant; and
- \$110,00 CalStart/WestStart

SunLine Transit Funding

- \$2.5 million from the California Air Resources Board
- \$1.5 million Congressional Earmark

PROGRAM EVALUATION

Extensive, multi-year evaluation program developed in conjunction with the U.S. Department of Energy and the National Renewable Energy Laboratory (NREL), and the Institute of Transportation Studies at the University of California – Davis.

Data, analyses, and reports will be compared with other fuel cell bus programs internationally, and a central repository of this information will be maintained by NREL and made available to the public on the AC Transit and NREL web sites.

AC Transit's evaluation will focus on service in hilly areas (operating on grades as steep as 17%), freeway express service to San Francisco, and service on heavy-duty trunk lines carrying in excess of 20,000 people per day. SunLine's evaluation will look at the effects of desert heat on fuel cell operation, as well as comparing fuel cell reliability with that of CNG buses.



SCHEDULE

| ACTIVITY | WHEN |
|---|----------------|
| Richmond Satellite Station Opening | October 2002 |
| Permanent Fueling Station and Maintenance Facility Completed | June 2005 |
| Delivery of first buses to AC Transit | September 2005 |
| 2 year program evaluation (continues throughout demonstration project). | 2005–2007 |
| 2 year Public Outreach and Education Program (continues throughout demonstration project). | 2005–2007 |

OTHER CRITICAL MILESTONES

- Design and build AC Transit's hydrogen maintenance center and fueling station. This facility will dispense 150 kilograms of hydrogen/day.
- SunLine Transit already has facilities in place, including an educational center, and is able to generate hydrogen utilizing a variety of technologies, including electrolysis from solar and wind power and natural gas reformation.

LONG-TERM DEVELOPMENT PLAN AND FINANCING

Build on successes of program by seeking additional grants in 2004 and 2005 to upgrade fuel cell systems and warranties, and to expand fleet size to test more vehicles under operating conditions that reflect the experience of large transit agencies.



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